ATPL-1806: SPECIAL TOPICS: UNDERGROUND PLUMBING SYSTEMS: APPLICATION AND INSTALLATION

Cuyahoga Community College

Viewing: ATPL-1806 : Special Topics: Underground Plumbing Systems: Application and Installation

Academic Term:
Fall 2026

Subject Code
ATPL - Applied Ind Tech - Plumbers

Course Number:
1806

Title:
Special Topics: Underground Plumbing Systems: Application and Installation

Catalog Description:
Advanced course covering the application and installation of underground plumbing systems including safety requirements. Also covered are installation techniques, applied math, construction tools and equipment and interpretation of mechanical drawings.

Credit Hour(s):
2

Lecture Hour(s):
2

Requisites

Prerequisite and Corequisite
Departmental Approval: admission to Plumber's apprenticeship program.

Outcomes

Course Outcome(s):
Discuss the applications of underground plumbing systems and identify the different types of pipe.

Objective(s):
1. Identify the applications of underground plumbing systems used in the residential, commercial, and industrial industries.
2. Explain how the different types of pipe are manufactured and discuss the importance of quality control.
3. List the different types of fittings used to join the different types of pipe.
4. Identify the various vertical and horizontal supports needed.
5. Review the Ohio Plumbing Code relative to the installation and venting of underground plumbing systems.

Course Outcome(s):
Discuss the safety procedures as prescribed by the Occupational Safety and Health Administration (OSHA) and related industry safety standards.

Objective(s):
1. Identify the hazards related to working underground.
2. Discuss the procedures used to protect the worker and building during underground installations.
3. List the Personal Protection Equipment (PPE) as prescribed by OSHA, required for safe installations.
4. Explain how gases and contamination in the earth can harm or cause death.

Course Outcome(s):

Interpret mechanical drawings and schematics and review related math concepts for material estimating, layout procedures, and pipe locations.

Objective(s):

1. Identify underground requirements on mechanical drawings.
2. Differentiate between mechanical drawings and schematics.
3. Determine pipe locations in the floors. Walls and ceilings from floor plans and specifications.
4. Estimate quantities of pipe and pipe fittings required for mechanical installations.
5. Establish different lists required for materials, tools, and equipment.
6. Review trade-related math concepts necessary for pipe layout and to install underground plumbing systems.

Course Outcome(s):

Describe and follow the procedures for locating mechanical requirements for residential and commercial structures.

Objective(s):

1. Locate the work area and position the materials and tools required for mechanical installations.
2. Layout locations of respective underground plumbing systems using applied math and geometry.
3. Select proper hand and power tools and safely operate the tools while performing installations.
4. Employ safety precautions as prescribed by OSHA and other related industry safety standards.

Methods of Evaluation:

1. Assignments
2. Participation
3. Attendance
4. Exams/quizzes

Course Content Outline:

1. Applications and Pipe
1. Residential
   a. Drainage systems
   b. Sewer
   c. Venting
2. Commercial
   a. Drainage
   b. Storm
   c. Sewer
   d. Venting
3. Pipe Manufacturing
   a. Seamless
   b. Rolled
   c. Composition of Materials
4. Fittings
   a. Wyes
   b. Sanitary Tees
   c. Bends
5. Suspension
   a. Supports
   b. Hangers
   c. Clamps
   d. Fasteners
6. Code standards

   a. Venting
   b. Drainage
   c. Storm

1. Safety Procedures

1. Id Hazards
   a. Fires
   b. Abrasions
   c. Burns
   d. Physical strains
2. Procedures for protection of worker(s)
   a. Pre task safety meetings
   b. Knowing the safety procedures of job site and employer
   c. Understanding OSHA regulations
3. PPE – ID and use
   a. Fire proof/heat resistance materials
   b. Proper body, foot and hand protection
   c. Eye and Face protection
4. Respiratory risks
   a. Breathing air
   b. Environmental
   c. Protection

1. Material, layout and locations
   a. Id supply and waste on drawings
      i. Code requirements
      ii. Interpret water and waste lines
      iii. Understanding what drawings to look at
   b. Mechanical drawings vs. schematics
      i. What is on mechanical drawings
      ii. What is lacking on mechanical drawings
      iii. Types of schematics
      iv. Schematic use in the installation process
   c. Determine locations of pipes
      i. Understanding floor plans
      ii. Using the correct revisions
      iii. Measurements from common locations
      iv. Understanding job Specifications
   d. Estimate quantities
      i. What is estimating
      ii. How to estimate from drawings and specifications
      iii. Common procedures
   e. Making lists
      i. Tools
      ii. Safety
      iii. Equipment
      iv. Materials
   f. Review of trade related math
      i. Types of Measurements
      ii. Geometry related to the installs
      iii. Using math for quick lay outs

1. Installations for Residential and Commercial
   a. Location, tools and materials required
      i. Locate area of installation
      ii. Stage tools required
      iii. Gather materials
      iv. Check PPE
   b. Layout Locations using math
      i. Drawings for layout
      ii. Demonstrate use of applied geometry math
      iii. Waste vs water supply layouts

c. Selection of tools
   i. Safe tool usage
   ii. Tool select
d. Use of Proper safety equipment
   i. PPE
   ii. Jobsite and employer safety regulations
   iii. Worker safety

Religious Accommodation

Before reviewing the course schedule, students should carefully review the following religious accommodation policy and other required instructional policies:

Religious Accommodation:

Students seeking an accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor with written notice of the specific dates for which the student requires an accommodation and must do so not later than fourteen (14) days after the first day of instruction. Please submit requests for accommodations at this link: https://portal2.tri-c.edu/ReligiousAccommodation/ Religious Accommodation Form. Students with questions about their religious accommodations under Ohio's Testing Your Faith Act may contact the College's Office of General Counsel and Legal Services by phone at 216.987.4856 or via email at legal@tri-c.edu.

Other Required Instructional Policies:

https://www.tri-c.edu/student-resources/curriculum/documents/syllabus-part-b.pdf

Weekly Schedule

	Topics
Week 1	o Introduction to Underground Plumbing Systems & Safety
Week 2	o Residential Underground Plumbing Applications
Week 3	o Commercial & Industrial Underground Systems
Week 4	o Drainage, Sewer, Storm & Venting Systems
Week 5	o Types of Pipe Used Underground
Week 6	o Pipe Manufacturing Methods & Materials
Week 7	o Fittings: Wyes, Sanitary Tees, Bends
Week 8	o Supports, Hangers, Clamps & Fasteners
Week 9	o Ohio Plumbing Code Requirements
Week 10	o OSHA Safety Standards & Jobsite Hazards
Week 11	o Personal Protective Equipment (PPE)
Week 12	o Mechanical Drawings vs. Schematics
Week 13	o Locating Underground Systems from Drawings
Week 14	o Estimating Materials & Trade Related Math
Week 15	o Layout Procedures & Applied Geometry
Week 16	o Tools, Installation Practices & Course Review

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Required/Recommended Readings
Instructor-provided materials

Resources for the Instructor

United Association Training Department. *Soldering and Brazing Manual*. Annapolis, MD: United Association, www.ua.org/training

United Association Training Department. *Drainage*. Annapolis, MD: United Association, www.ua.org/training

Additional Resources for the Instructor
www.copper.org (https://catalog.tri-c.eduwww.copper.org)
www.kpsec.freeuk.com/solder.htm (https://catalog.tri-c.eduwww.kpsec.freeuk.com/solder.htm)
www.brazing.com (https://catalog.tri-c.eduwww.brazing.com)
www.ua.org (https://catalog.tri-c.eduwww.ua.org)

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